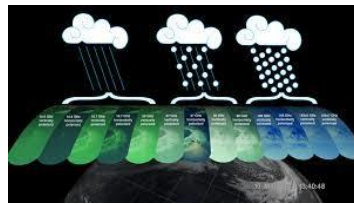


Global Precipitation Measurement Mission

From Satellites to Your Backyard Updated 1/2022



Did you know that NASA has a satellite that is able to observe rain and snow all over the world? By following some easy directions, you can access NASA data to see how much precipitation was observed by satellites for your location any time from June 2000 to the present time!

NASA's [Global Precipitation Measurement \(GPM\) mission](#) is an international satellite mission in collaboration with the Japan Aerospace Exploration Agency (JAXA) that uses multiple satellites orbiting Earth to collect rain, snow, and other precipitation data worldwide every thirty minutes. The GPM Core Observatory was launched from Japan in 2014. GPM is a follow up mission to the [Tropical Rainfall Measuring Mission](#) (TRMM), which launched in 1998. Thus, we have a detailed dataset of global precipitation observations that span almost two decades. These observations are available for most of the world. We are going to be working with the [Integrated Multi-satellitE Retrievals for GPM](#), or IMERG, data from the TRMM and GPM satellite missions.

In this activity, you will be guided to download seasonal IMERG liquid accumulation equivalents which you can use to see how much precipitation was observed for your location. As the spatial resolution (the area covered by each data point) for IMERG data is an approximately 10-kilometer/~6-mile square region, the amount of precipitation that you will see from the data you get may differ from exactly how much fell at your specific location. Because it can rain heavily on one block, while right down the street the ground is still dry, inaccuracies in processing the satellite observations can cause differences as well.


These data are available from June 2000 to nearly the present time. This data product has a 3-month latency, which means it takes about 3 months from the time the data is collected to it being processed and made available for download. While in this activity we will work with seasonal data, it is also very easy to look at monthly data as well. For more advanced users, there are IMERG datasets available with a much faster latency, and you can see how to access that data [here](#).

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Getting the GPM data

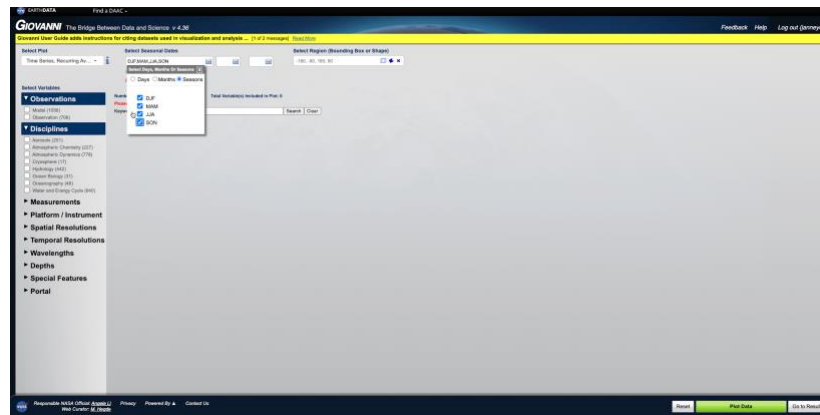
To see an animation showing the last week of IMERG data, click [here](#).

- [illegible]

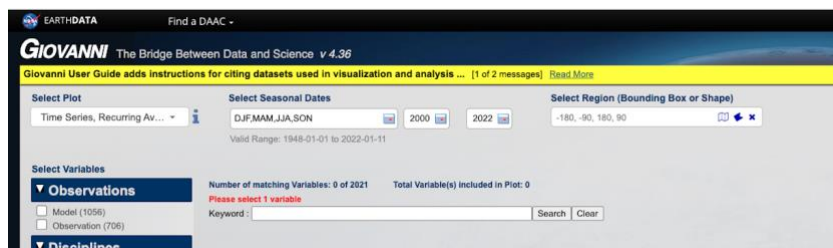
- 
- The screenshot shows the GIOVANNI web interface. At the top, there is a navigation bar with links for 'Feedback', 'Help', and 'Log Out (anonymous)'. Below the navigation bar, there is a sidebar on the left with a search bar and a list of categories: 'Parameters', 'Measurements', 'Platform / Instrument', 'Spatial Resolutions', 'Temporal Resolutions', 'Wavelengths', 'Depth', 'Special Features', and 'Portal'. The main content area displays the 'Select Parameters' dialog box. The dialog box has three tabs: 'Select Plot', 'Select Seasonal Data', and 'Select Region (Displaying Box or Shape)'. The 'Select Plot' tab is active, showing a list of parameters to be plotted. The 'Seasonal Data' tab is also visible, showing a list of seasonal data parameters. The 'Region' tab is not visible. The dialog box is titled 'Select Parameters' and has a close button (X) in the top right corner. The background shows the GIOVANNI web interface with a navigation bar and a sidebar.
- Select Parameters**
- Select Plot**
- Time Series, Resampling By:

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- Under “*Select Seasonal Dates*”, I chose seasons for this demonstration. I clicked on “*seasons*”, then selected all four seasons. (DJF= Dec., Jan., Feb. and so on)



- Next, select the years for which you would like to view precipitation data. The IMERG data range from June 2000 through the present time. (There is a 3 month "lag" in this level of data, which means you will only get data up to about 3 months from today.) For this example, I put in 2000 to 2022 for my dates. You may need to type in the years by hand as this box area can jump around.



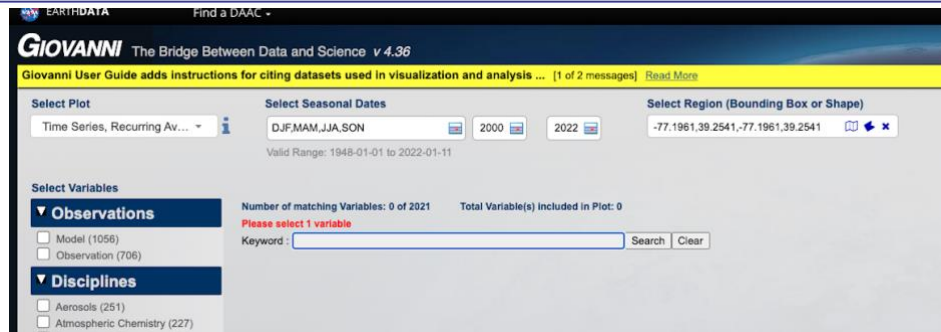
- You will select the location that you want observations to cover. In the “*Select Region*” box, you must put the **longitude first**, no space, a comma, no space, and latitude. Here is my example: for my location “-77.1961,39.2541” for my location in Maryland. You can find the longitude and latitude of any location [here](#). (This platform uses decimal coordinates. After you input the coordinates in the “*Select Region*” box, it will then repeat these values to show you are selecting just one specific location. Giovanni also lets you measure across larger regions defined by a “*bounding box*”. Keep in mind as you analyze your data that precipitation is quite variable and each IMERG data point covers ~10km square region.)

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GIOVANNI The Bridge Between Data and Science v 4.36

Giovanni User Guide adds instructions for citing datasets used in visualization and analysis ... [1 of 2 messages] [Read More](#)

Select Plot: Time Series, Recurring Av...

Select Seasonal Dates: DJF,MAM,JJA,SON 2000 2022

Select Region (Bounding Box or Shape): -77.1961,39.2541,-77.1961,39.2541

Valid Range: 1948-01-01 to 2022-01-11

Number of matching Variables: 0 of 2021 Total Variable(s) included in Plot: 0

Please select 1 variable

Keyword: Search Clear

Select Variables

Observations

☐ Model (1056)

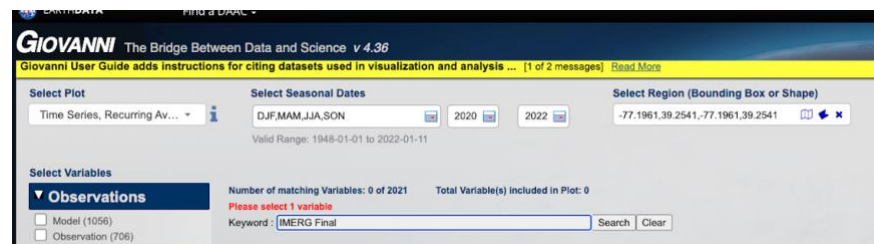
☐ Observation (706)

Disciplines

☐ Aerosols (251)

☐ Atmospheric Chemistry (227)

6. In the box that says in red "Please select 1 variable"- type "IMERG Final" and press "search".



GIOVANNI The Bridge Between Data and Science v 4.36

Giovanni User Guide adds instructions for citing datasets used in visualization and analysis ... [1 of 2 messages] [Read More](#)

Select Plot: Time Series, Recurring Av...

Select Seasonal Dates: DJF,MAM,JJA,SON 2020 2022

Select Region (Bounding Box or Shape): -77.1961,39.2541,-77.1961,39.2541

Valid Range: 1948-01-01 to 2022-01-11

Number of matching Variables: 0 of 2021 Total Variable(s) included in Plot: 0

Please select 1 variable

Keyword: IMERG Final Search Clear

Select Variables

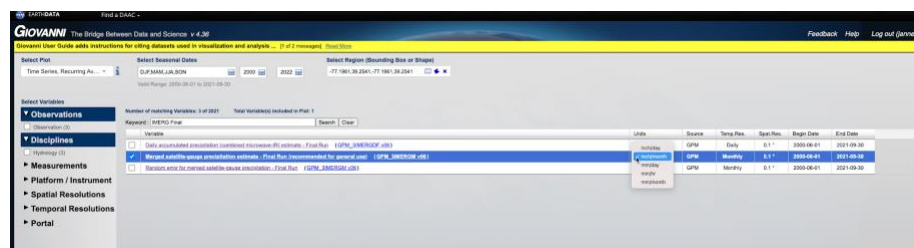
Observations

☐ Model (1056)

☐ Observation (706)

Disciplines

7. Click on "Merged satellite-gauge precipitation estimate- Final Run (GPM_3IMERGM_v6)" and be sure to go to the box that says "units" and select either "inch/month" or "mm/month" based on your preference. For this example, I chose inches/month.



GIOVANNI The Bridge Between Data and Science v 4.36

Giovanni User Guide adds instructions for citing datasets used in visualization and analysis ... [1 of 2 messages] [Read More](#)

Select Plot: Time Series, Recurring Av...

Select Seasonal Dates: DJF,MAM,JJA,SON 2000 2022

Select Region (Bounding Box or Shape): -77.1961,39.2541,-77.1961,39.2541

Valid Range: 1948-01-01 to 2022-01-11

Number of matching Variables: 1 of 2021 Total Variable(s) included in Plot: 1

Keyword: IMERG Final Search Clear

Select Variables

Observations

☐ Model (1056)

☐ Observation (706)

Disciplines

☒ Merged satellite-gauge precipitation estimate- Final Run (GPM_3IMERGM_v6)

Units

☒ inch/month

☐ mm/month

Source

☐ GPM

Time Res.

☐ Daily

Start Date

☐ 2000-01-01

End Date

☐ 2021-09-30

8. Go down to the bottom right of the screen and click on the green box: "Plot Data". Click it and wait for your data to be processed.

developed by the

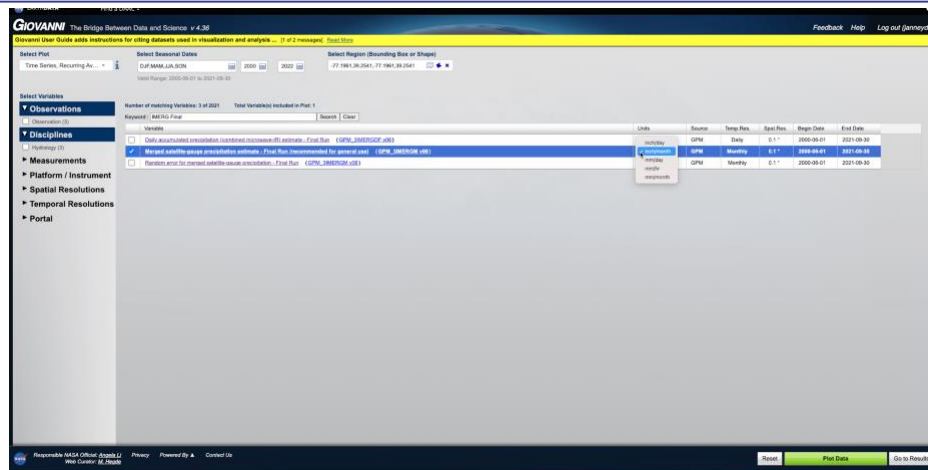
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As you wait for your data request to be processed, you should see a box that says "launching workflow" in the top left-hand corner and other information will come up telling you the status of your request. Note that the data may take a while to download depending on your bandwidth and the amount of data you have requested.

If you have done everything correctly, you will now see a line graph with four different colored lines. The key at the bottom tells you the colors that match to each season.



You can see how the amount of precipitation changes over time and compare the amount of rain between seasons and over the years. If you hover over a point on the interactive online graph, the exact measurement will be displayed, as seen in the example above for June/July/August 2004. Save and download the graph by clicking on the three lines to the right near the top of the box. You can also view the data in a spreadsheet. For a spreadsheet, click on the far-left menu bar option that says "Downloads" and then select the bottom choice that is titled "Combined CSV". You will need to be logged into your Earthdata account to use these features.



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developed by the

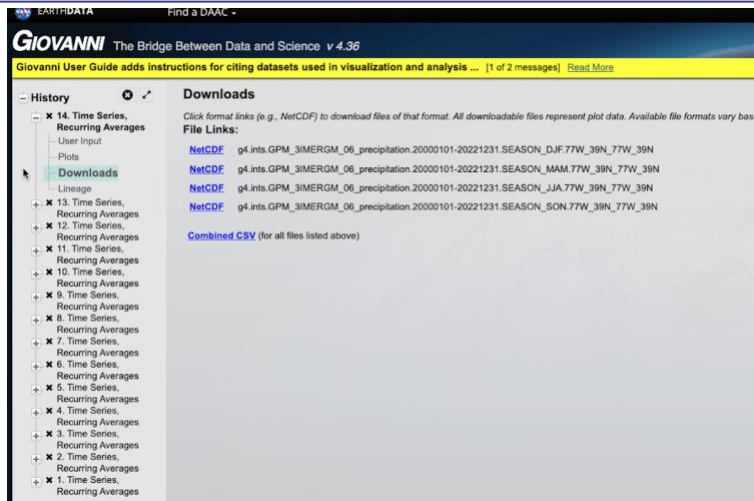
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Additional Resources

In case you want to learn more, here are some great resources:

- Find out how to access TRMM and GPM Precipitation data sets [here](#).
- Learn how to use GPM precipitation data at our "[How to Use GPM Data](#)" page.
- Watch "[Getting the Big Picture](#)" video (2:39) to learn about the uses and advantages of remote sensing
- Read "[Understanding Earth: What's Up with Precipitation?](#)" to learn how and why NASA satellites observe global precipitation.
- See the wide array of education and outreach resources on the "[Precipitation Education](#)" website.
- Discover the many ways in which these data are being used in real-world applications at "[Whose Using GPM Data?](#)"
- Watch "[The Data Downpour](#)" video (4:17) to learn how IMERG data is gathered and processed.



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